

WHAT IS CLAIMED IS:

1. An apparatus for specimen fabrication comprising:

a movable specimen stage for placing thereon a sample substrate;

an energy-beam irradiating optical system for irradiating a processing beam to said sample substrate near a desired area thereof to cut out a micro-sample including said desired area of said sample substrate;

a probe for contacting a portion thereof with said sample substrate near said desired area;

probe-substrate connecting means for fixing together said probe and a portion of said sample substrate near said desired area;

a micro-sample holder retainer for movably retaining a micro-sample holder supporting said micro-sample;

a circuit for sending electric current to probe for applying a voltage across said probe and said micro-sample holder to perform current welding between said probe and said micro-sample holder;

a probe driver for driving said probe; and

a probe position controller for controlling said probe driver to cause said probe to approach said micro-sample holder.

2. An apparatus for specimen fabrication according to claim 1, wherein said probe position controller drives said probe driver to cause said probe

to approach said micro-sample holder after the voltage is applied across said probe and said micro-sample holder.

3. An apparatus for specimen fabrication according to claim 1, wherein said energy-beam irradiating optical system is an ion-beam irradiating optical system for irradiating an ion beam.

4. An apparatus for specimen fabrication according to claim 1, wherein said circuit for sending electric current to probe is used, and the voltage applied across said probe and said micro-sample holder is 200 V or less.

5. An apparatus for specimen fabrication according to claim 1, wherein said probe-substrate connecting means comprises a voltage applying circuit for performing current welding by applying a voltage across said probe and said sample substrate.

6. A method for specimen fabrication comprising:  
a probe-sample fixing step of fixing a tip portion of a probe to a desired area of a sample substrate; and

a micro-sample separating step of, while maintaining a fixed state therebetween, cutting out said desired area from said sample substrate and separating said desired area from said sample substrate as a micro-sample,

wherein said micro-sample is moved to a position over a desired position of a micro-sample

holder, then said micro-sample is fixed to said micro-sample holder, then said probe fixing said micro-sample thereon is cut near the tip portion thereof.

7. A method for specimen fabrication according to claim 6, wherein said micro-sample and said micro-sample holder are fixed together with a constant gap maintained between a lower surface of said micro-sample and said micro-sample holder.

8. A method for specimen fabrication according to claim 6, further comprising a probe-micro-sample holder welding step of performing current welding between said probe and said micro-sample holder.

9. A method for specimen fabrication according to claim 8, wherein approaching between said probe and said micro-sample holder is carried out after a step of applying a voltage for said current welding.

10. A method for specimen fabrication comprising:  
a probe fixing step of fixing a tip portion of a probe to a portion of a sample substrate near an area thereof to be observed;

a micro-sample separating step of separating a micro-sample including said area to be observed, from said sample substrate while said micro-sample is fixed to the tip portion of said probe;

a voltage applying step of applying a voltage across said probe and a micro-sample holder;

a micro-sample approaching step of causing said micro-sample and said micro-sample holder to

approach each other after said voltage applying step;

a micro-sample-micro-sample holder welding step of fixing together said micro-sample and said micro-sample holder by current welding therebetween; and

a probe cutting step of cutting said probe from said micro-sample fixedly connected to said micro-sample holder.

11. A method for specimen fabrication according to claim 10, wherein ion-beam processing is used in said micro-sample separating step.

12. A method for specimen fabrication according to claim 10, wherein said micro-sample is a sample for a transmission electron microscope.

13. A method for specimen fabrication according to claim 10, wherein a height of said micro-sample is 5  $\mu\text{m}$  or less.